



SEQUENCE LISTING

<110> University of Newcastle Upon Tyne

<120> Fusion Proteins

<130> P69705US0

<140> US 10/501,071

<141> 2005-02-14

<150> GB 0200689.8

<151> 2002-01-10

<160> 62

<170> PatentIn version 3.1

<210> 1

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Ala3-His6 tail

<400> 1

Ala Ala Ala His His His His His
1 5

<210> 2

<211> 25

<212> PRT

<213> Escherichia coli

<400> 2

Met Asn Met Lys Lys Leu Ala Thr Leu Val Ser Ala Val Ala Leu Ser
1 5 10 15

Ala Thr Val Ser Ala Asn Ala Met Ala
20 25

<210> 3

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage site for enterokinase

<400> 3

Asp Asp Asp Asp Lys
1 5

<210> 4

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage site for thrombin

<400> 4

Leu Val Pro Arg
1

<210> 5

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage site for factor Xa

<400> 5

Ile Glu Gly Arg
1

<210> 6

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> 4xHis tag

<400> 6

His His His His
1

<210> 7

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> 5xHis tag

<400> 7

His His His His His
1 5

<210> 8

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> 6xHis tag

<400> 8

His His His His His His
1 5

<210> 9

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> 7xHis tag

<400> 9

His His His His His His His
1 5

<210> 10

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> 8xHis tag

<400> 10

His His His His His His His His
1 5

<210> 11

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> 9xHis tag

<400> 11

His His His His His His His His
1 5

<210> 12

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> 10xHis tag

<400> 12

His His His His His His His His His His
1 5 10

<210> 13

<211> 93

<212> PRT

<213> Escherichia coli

<400> 13

Asn Asn Gly Ala Ser Gly Ala Asp Ile Asn Asn Tyr Ala Gly Gln Ile
1 5 10 15

Lys Ser Ala Ile Glu Ser Lys Phe Tyr Asp Ala Ser Ser Tyr Ala Gly
20 25 30

Lys Thr Cys Thr Leu Arg Ile Lys Leu Ala Pro Asp Gly Met Leu Leu
35 40 45

Asp Ile Lys Pro Glu Gly Gly Asp Pro Ala Leu Cys Gln Ala Ala Leu
50 55 60

Ala Ala Ala Lys Leu Ala Lys Ile Pro Lys Pro Pro Ser Gln Ala Val
65 70 75 80

Tyr Glu Val Phe Lys Asn Ala Pro Leu Asp Phe Lys Pro
85 90

<210> 14

<211> 348

<212> PRT

<213> Artificial Sequence

<220>

<223> TolA-BCL fusion protein

<400> 14

Met His His His His His His Ser Ser Asn Asn Gly Ala Ser Gly Ala
1 5 10 15

Asp Ile Asn₂₀ Tyr Ala Gly Gln₂₅ Ile Lys Ser Ala Ile Glu₃₀ Ser Lys
 Phe Tyr Asp₃₅ Ala Ser Ser Tyr Ala₄₀ Gly Lys Thr Cys₄₅ Thr Leu Arg Ile
 Lys₅₀ Leu Ala Pro Asp Gly₅₅ Met Leu Leu Asp Ile Lys₆₀ Pro Glu Gly Gly
 Asp₆₅ Pro Ala Leu Cys Gln₇₀ Ala Ala Leu Ala₇₅ Ala Lys Leu Ala Lys₈₀
 Ile Pro Lys Pro₈₅ Ser Gln Ala Val Tyr₉₀ Glu Val Phe Lys Asn₉₅ Ala
 Pro Leu Asp Phe₁₀₀ Lys Pro Gly Gly₁₀₅ Ser Gly Ser Leu Val₁₁₀ Pro Arg
 Gly Ser Arg₁₁₅ Pro Ser Gln Ser Asn₁₂₀ Arg Glu Leu Val Val₁₂₅ Asp Phe Leu
 Ser Tyr₁₃₀ Lys Leu Ser Gln Lys₁₃₅ Gly Tyr Ser Trp Ser₁₄₀ Gln Phe Ser Asp
 Val₁₄₅ Glu Glu Asn Arg Thr₁₅₀ Glu Ala Pro Glu Gly₁₅₅ Thr Glu Ser Glu Met₁₆₀
 Glu Thr Pro Ser Ala₁₆₅ Ile Asn Gly Asn₁₇₀ Pro Ser Trp His Leu Ala Asp₁₇₅
 Ser Pro Ala Val₁₈₀ Asn Gly Ala Thr Ala₁₈₅ His Ser Ser Ser Leu₁₉₀ Asp Ala
 Arg Glu Val₁₉₅ Ile Pro Met Ala Ala₂₀₀ Val Lys Gln Ala Leu₂₀₅ Arg Glu Ala
 Gly Asp₂₁₀ Glu Phe Glu Leu Arg₂₁₅ Tyr Arg Arg Ala Phe₂₂₀ Ser Asp Leu Thr
 Ser Gln Leu His Ile Thr₂₃₀ Pro Gly Thr Ala Tyr₂₃₅ Gln Ser Phe Glu Gln₂₄₀
 Val Val Asn Glu Leu₂₄₅ Phe Arg Asp Gly Val₂₅₀ Asn Trp Gly Arg Ile₂₅₅ Val
 Ala Phe Phe Ser₂₆₀ Phe Gly Gly Ala Leu₂₆₅ Cys Val Glu Ser Val₂₇₀ Asp Lys
 Glu Met Gln Val Leu Val Ser Arg Ile Ala Ala Trp Met Ala Thr Tyr

275

280

285

Leu Asn Asp His Leu Glu Pro Trp Ile Gln Glu Asn Gly Gly Trp Asp
 290 295 300

Thr Phe Val Glu Leu Tyr Gly Asn Asn Ala Ala Ala Glu Ser Arg Lys
 305 310 315 320

Gly Gln Glu Arg Phe Asn Arg Trp Phe Leu Thr Gly Met Thr Val Ala
 325 330 335

Gly Val Val Leu Leu Gly Ser Leu Phe Ser Arg Lys
 340 345

<210> 15

<211> 236

<212> PRT

<213> Artificial Sequence

<220>

<223> TolA-BCL fusion protein after thrombin cleavage

<400> 15

Gly Ser Arg Pro Ser Gln Ser Asn Arg Glu Leu Val Val Asp Phe Leu
 1 5 10 15

Ser Tyr Lys Leu Ser Gln Lys Gly Tyr Ser Trp Ser Gln Phe Ser Asp
 20 25 30

Val Glu Glu Asn Arg Thr Glu Ala Pro Glu Gly Thr Glu Ser Glu Met
 35 40 45

Glu Thr Pro Ser Ala Ile Asn Gly Asn Pro Ser Trp His Leu Ala Asp
 50 55 60

Ser Pro Ala Val Asn Gly Ala Thr Ala His Ser Ser Ser Leu Asp Ala
 65 70 75 80

Arg Glu Val Ile Pro Met Ala Ala Val Lys Gln Ala Leu Arg Glu Ala
 85 90 95

Gly Asp Glu Phe Glu Leu Arg Tyr Arg Arg Ala Phe Ser Asp Leu Thr
 100 105 110

Ser Gln Leu His Ile Thr Pro Gly Thr Ala Tyr Gln Ser Phe Glu Gln
 115 120 125

Val Val Asn Glu Leu Phe Arg Asp Gly Val Asn Trp Gly Arg Ile Val
130 135 140

Ala Phe Phe Ser Phe Gly Gly Ala Leu Cys Val Glu Ser Val Asp Lys
145 150 155 160

Glu Met Gln Val Leu Val Ser Arg Ile Ala Ala Trp Met Ala Thr Tyr
165 170 175

Leu Asn Asp His Leu Glu Pro Trp Ile Gln Glu Asn Gly Gly Trp Asp
180 185 190

Thr Phe Val Glu Leu Tyr Gly Asn Asn Ala Ala Ala Glu Ser Arg Lys
195 200 205

Gly Gln Glu Arg Phe Asn Arg Trp Phe Leu Thr Gly Met Thr Val Ala
210 215 220

Gly Val Val Leu Leu Gly Ser Leu Phe Ser Arg Lys
225 230 235

<210> 16

<211> 115

<212> PRT

<213> Artificial Sequence

<220>

<223> Tagged TolAIII region of pTol vectors

<220>

<221> MISC_FEATURE

<222> (107)..(111)

<223> Xaa residues represent cleavage sites DDDDK (SEQ ID NO: 3), LVPR (SEQ ID NO: 4; no Xaa at position 111) or IEGR (SEQ ID NO: 5; no Xaa at position 111)

<400> 16

Met His His His His His His Ser Ser Asn Asn Gly Ala Ser Gly Ala
1 5 10 15

Asp Ile Asn Asn Tyr Ala Gly Gln Ile Lys Ser Ala Ile Glu Ser Lys
20 25 30

Phe Tyr Asp Ala Ser Ser Tyr Ala Gly Lys Thr Cys Thr Leu Arg Ile
35 40 45

Lys Leu Ala Pro Asp Gly Met Leu Leu Asp Ile Lys Pro Glu Gly Gly
50 55 60

Asp Pro Ala Leu Cys Gln Ala Ala Leu Ala Ala Lys Leu Ala Lys
65 70 75 80

Ile Pro Lys Pro Pro Ser Gln Ala Val Tyr Glu Val Phe Lys Asn Ala
85 90 95

Pro Leu Asp Phe Lys Pro Gly Gly Gly Ser Xaa Xaa Xaa Xaa Xaa Gly
100 105 110

Ser Gly Thr
115

<210> 17

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> His6-Ser2 linker

<400> 17

His His His His His His Ser Ser
1 5

<210> 18

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> short flexible polypeptide

<400> 18

Gly Gly Gly Ser
1

<210> 19
<211> 51
<212> DNA
<213> Artificial Sequence

<220>

<223> Cleavage/cloning site of pTolE vector

<400> 19
ggtgggggat ctgatgatga cgataaagga tccggtacct gatgaacgcg t 51

<210> 20
<211> 48
<212> DNA
<213> Artificial Sequence

<220>

<223> Cleavage/cloning site of pTolT vector

<400> 20
ggtgggggat ctctggttcc gcgcggatcc ggtacctgat gaacgcgt 48

<210> 21
<211> 48
<212> DNA
<213> Artificial Sequence

<220>

<223> Cleavage/cloning site of pTolX vector

<400> 21
ggtgggggat ctattgaagg tcgcggatcc ggtacctgat gaacgcgt 48

<210> 22
<211> 17
<212> PRT
<213> Artificial Sequence

<220>

<223> Cleavage/cloning site of pTolE vector

<220>

<221> MISC_FEATURE

<222> (14)..(15)

<223> xaa represents stop codon site

<400> 22

Gly Gly Gly Ser Asp Asp Asp Asp Lys Gly Ser Gly Thr Xaa Xaa Thr
1 5 10 15

Arg

<210> 23

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage/cloning site of pTolT vector

<220>

<221> MISC_FEATURE

<222> (13)..(14)

<223> xaa represents stop codon site

<400> 23

Gly Gly Gly Ser Leu Val Pro Arg Gly Ser Gly Thr Xaa Xaa Thr Arg
1 5 10 15

<210> 24

<211> 16

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage/cloning site of pTolX vector

<220>

<221> MISC_FEATURE

<222> (13)..(14)

<223> Xaa represents stop codon site

<400> 24

Gly Gly Gly Ser Ile Glu Gly Arg Gly Ser Gly Thr Xaa Xaa Thr Arg
1 5 10 15

<210> 25

<211> 2

<212> PRT

<213> Artificial Sequence

<220>

<223> Gly-Ser tag

<400> 25

Gly Ser
1

<210> 26

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Gly-Ser-Gly-Thr tag

<400> 26

Gly Ser Gly Thr
1

<210> 27

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 27
gatctgatga tgacgataaa ggatccggta cctgatgaa

39

<210> 28

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 28
cgcggtcatc aggtaccgga tcctttatcg tcatcatca

39

<210> 29

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 29
gatctattga aggtcgcgga tccggtacct gatgaa

36

<210> 30

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 30
cgcggtcatc aggtaccgga tccgcgacct tcaata

36

<210> 31

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 31

gatctctggg tccgcgcgga tccggtacct gatgaa

36

<210> 32

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 32

cgcgttcatac aggtaccgga tccgcgcgga accaga

36

<210> 33

<211> 37

<212> PRT

<213> Escherichia coli

<400> 33

Asn Ser Asn Gly Trp Ser Trp Ser Asn Lys Pro His Lys Asn Asp Gly
1 5 10 15

Phe His Ser Asp Gly Ser Tyr His Ile Thr Phe His Gly Asp Asn Asn
20 25 30

Ser Lys Pro Lys Pro
35

<210> 34

<211> 80

<212> PRT

<213> Escherichia coli

<400> 34

Asn Asn Ala Phe Gly Gly Gly Lys Asn Pro Gly Ile Gly Asn Thr Ser
1 5 10 15
Gly Ala Gly Ser Asn Gly Ser Ala Ser Ser Asn Arg Gly Asn Ser Asn
20 25 30
Gly Trp Ser Trp Ser Asn Lys Pro His Lys Asn Asp Gly Phe His Ser
35 40 45
Asp Gly Ser Tyr His Ile Thr Phe His Gly Asp Asn Asn Ser Lys Pro
50 55 60
Lys Pro Gly Gly Asn Ser Gly Asn Arg Gly Asn Asn Gly Asp Gly Ala
65 70 75 80

<210> 35

<211> 117

<212> PRT

<213> Escherichia coli

<400> 35

His Gly Asp Asn Asn Ser Lys Pro Lys Pro Gly Gly Asn Ser Gly Asn
1 5 10 15
Arg Gly Asn Asn Gly Asp Gly Ala Ser Ala Lys Val Gly Glu Ile Thr
20 25 30
Ile Thr Pro Asp Asn Ser Lys Pro Gly Arg Tyr Ile Ser Ser Asn Pro
35 40 45
Glu Tyr Ser Leu Leu Ala Lys Leu Ile Asp Ala Glu Ser Ile Lys Gly
50 55 60
Thr Glu Val Tyr Thr Phe His Thr Arg Lys Gly Gln Tyr Val Lys Val
65 70 75 80
Thr Val Pro Asp Ser Asn Ile Asp Lys Met Arg Val Asp Tyr Val Asn
85 90 95
Trp Lys Gly Pro Lys Tyr Asn Asn Lys Leu Val Lys Arg Phe Val Ser
100 105 110

Gln Phe Leu Leu Phe
115

<210> 36

<211> 124

<212> PRT

<213> Homo sapiens

<400> 36

Asn Leu Val Asn Phe His Arg Met Ile Lys Leu Thr Thr Gly Lys Glu
1 5 10 15

Ala Ala Leu Ser Tyr Gly Phe Tyr Gly Cys His Cys Gly Val Gly Gly
20 25 30

Arg Gly Ser Pro Lys Asp Ala Thr Asp Arg Cys Cys Val Thr His Asp
35 40 45

Cys Cys Tyr Lys Arg Leu Glu Lys Arg Gly Cys Gly Thr Lys Phe Leu
50 55 60

Ser Tyr Lys Phe Ser Asn Ser Gly Ser Arg Ile Thr Cys Ala Lys Gln
65 70 75 80

Asp Ser Cys Arg Ser Gln Leu Cys Glu Cys Asp Lys Ala Ala Ala Thr
85 90 95

Cys Phe Ala Arg Asn Lys Thr Thr Tyr Asn Lys Lys Tyr Gln Tyr Tyr
100 105 110

Ser Asn Lys His Cys Arg Gly Ser Thr Pro Arg Cys
115 120

<210> 37

<211> 179

<212> PRT

<213> Actinia equina

<400> 37

Ser Ala Asp Val Ala Gly Ala Val Ile Asp Gly Ala Ser Leu Ser Phe
1 5 10 15

Asp Ile Leu Lys Thr Val Leu Glu Ala Leu Gly Asn Val Lys Arg Lys
20 25 30

Ile Ala Val Gly Val Asp Asn Glu Ser Gly Lys Thr Trp Thr Ala Leu
35 40 45

Asn Thr Tyr Phe Arg Ser Gly Thr Ser Asp Ile Val Leu Pro His Lys
50 55 60

Val Pro His Gly Lys Ala Leu Leu Tyr Asn Gly Gln Lys Asp Arg Gly
65 70 75 80

Pro Val Ala Thr Gly Ala Val Gly Val Leu Ala Tyr Leu Met Ser Asp
85 90 95

Gly Asn Thr Leu Ala Val Leu Phe Ser Val Pro Tyr Asp Tyr Asn Trp
100 105 110

Tyr Ser Asn Trp Trp Asn Val Arg Ile Tyr Lys Gly Lys Arg Arg Ala
115 120 125

Asp Gln Arg Met Tyr Glu Glu Leu Tyr Tyr Asn Leu Ser Pro Phe Arg
130 135 140

Gly Asp Asn Gly Trp His Thr Arg Asn Leu Gly Tyr Gly Leu Lys Ser
145 150 155 160

Arg Gly Phe Met Asn Ser Ser Gly His Ala Ile Leu Glu Ile His Val
165 170 175

Ser Lys Ala

<210> 38

<211> 191

<212> PRT

<213> Homo sapiens

<400> 38

Thr Gly Ala Gly Lys Thr Ser Leu Leu Met Met Ile Met Gly Glu Leu
1 5 10 15

Glu Pro Ser Glu Gly Lys Ile Lys His Ser Gly Arg Ile Ser Phe Cys
20 25 30

Ser Gln Phe Ser Trp Ile Met Pro Gly Thr Ile Lys Glu Asn Ile Ile
35 40 45

Phe Gly Val Ser Tyr Asp Glu Tyr Arg Tyr Arg Ser Val Ile Lys Ala
50 55 60

Cys Gln Leu Glu Glu Asp Ile Ser Lys Phe Ala Glu Lys Asp Asn Ile
65 70 75 80

Val Leu Gly Glu Gly Gly Ile Thr Leu Ser Gly Gly Gln Arg Ala Arg
85 90 95

Ile Ser Leu Ala Arg Ala Val Tyr Lys Asp Ala Asp Leu Tyr Leu Leu
100 105 110

Asp Ser Pro Phe Gly Tyr Leu Asp Val Leu Thr Glu Lys Glu Ile Phe
115 120 125

Glu Ser Cys Val Cys Lys Leu Met Ala Asn Lys Thr Arg Ile Leu Val
130 135 140

Thr Ser Lys Met Glu His Leu Lys Lys Ala Asp Lys Ile Leu Ile Leu
145 150 155 160

His Glu Gly Ser Ser Tyr Phe Tyr Gly Thr Phe Ser Glu Leu Gln Asn
165 170 175

Leu Gln Pro Asp Phe Ser Ser Lys Leu Met Gly Cys Asp Ser Phe
180 185 190

<210> 39

<211> 390

<212> PRT

<213> Homo sapiens

<400> 39

Lys Tyr Ile Glu His Phe Ser Lys Phe Ser Pro Ser Pro Leu Ser Met
1 5 10 15

Lys Gln Phe Leu Asp Phe Gly Ser Ser Asn Ala Cys Glu Lys Thr Ser
20 25 30

Phe Thr Phe Leu Arg Gln Glu Leu Pro Val Arg Leu Ala Asn Ile Met
35 40 45

Lys Glu Ile Asn Leu Leu Pro Asp Arg Val Leu Ser Thr Pro Ser Val

50					55					60					
Gln 65	Leu	Val	Gln	Ser	Trp 70	Tyr	Val	Gln	Ser	Leu 75	Leu	Asp	Ile	Met	Glu 80
Phe	Leu	Asp	Lys 85	Asp	Pro	Glu	Asp	His	Arg 90	Thr	Leu	Ser	Gln	Phe	Thr 95
Asp	Ala	Leu	Val 100	Thr	Ile	Arg	Asn	Arg 105	His	Asn	Asp	Val	Val 110	Pro	Thr
Met	Ala	Gln 115	Gly	Val	Leu	Glu	Tyr 120	Lys	Asp	Thr	Tyr	Gly 125	Asp	Asp	Pro
Val	Ser 130	Asn	Gln	Asn	Ile	Gln 135	Tyr	Phe	Leu	Asp	Arg 140	Phe	Tyr	Leu	Ser
Arg 145	Ile	Ser	Ile	Arg	Met 150	Leu	Ile	Asn	Gln	His 155	Thr	Leu	Ile	Phe	Asp 160
Gly	Ser	Thr	Asn	Pro 165	Ala	His	Pro	Lys	His 170	Ile	Gly	Ser	Ile	Asp 175	Pro
Asn	Cys	Asn	Val 180	Ser	Glu	Val	Val	Lys 185	Asp	Ala	Tyr	Asp	Met 190	Ala	Lys
Leu	Leu	Cys 195	Asp	Lys	Tyr	Tyr	Met 200	Ala	Ser	Pro	Asp	Leu 205	Glu	Ile	Gln
Glu 210	Ile	Asn	Ala	Ala	Asn	Ser 215	Lys	Gln	Pro	Ile	His 220	Met	Val	Tyr	Val
Pro 225	Ser	His	Leu	Tyr	His 230	Met	Leu	Phe	Glu	Leu 235	Phe	Lys	Asn	Ala	Met 240
Arg	Ala	Thr	Val	Glu 245	Ser	His	Glu	Ser	Ser 250	Leu	Ile	Leu	Pro	Pro 255	Ile
Lys	Val	Met	Val 260	Ala	Leu	Gly	Glu	Glu 265	Asp	Leu	Ser	Ile	Lys 270	Met	Ser
Asp	Arg	Gly 275	Gly	Gly	Val	Pro	Leu 280	Arg	Lys	Ile	Glu	Arg 285	Leu	Phe	Ser
Tyr	Met 290	Tyr	Ser	Thr	Ala	Pro 295	Thr	Pro	Gln	Pro	Gly 300	Thr	Gly	Gly	Thr
Pro 305	Leu	Ala	Gly	Phe	Gly 310	Tyr	Gly	Leu	Pro	Ile 315	Ser	Arg	Leu	Tyr	Ala 320

Lys Tyr Phe Gln Gly Asp Leu Gln Leu Phe Ser Met Glu Gly Phe Gly
325 330 335

Thr Asp Ala Val Ile Tyr Leu Lys Ala Leu Ser Thr Asp Ser Val Glu
340 345 350

Arg Leu Pro Val Tyr Asn Lys Ser Ala Trp Arg His Tyr Gln Thr Ile
355 360 365

Gln Glu Ala Gly Asp Trp Cys Val Pro Ser Thr Glu Pro Lys Asn Thr
370 375 380

Ser Thr Tyr Arg Val Ser
385 390

<210> 40

<211> 202

<212> PRT

<213> Bacillus licheniformis

<400> 40

Ser Phe Ser Glu Leu Asn Ile Asp Ala Phe Arg Phe Ile Asn Asp Leu
1 5 10 15

Gly Lys Glu Tyr Ser Met Leu Asn Pro Val Val Tyr Phe Leu Ala Glu
20 25 30

Tyr Met Met Tyr Phe Leu Ala Leu Gly Leu Val Val Tyr Trp Leu Thr
35 40 45

Arg Thr Thr Lys Asn Arg Leu Met Val Ile Tyr Ala Val Ile Ala Phe
50 55 60

Val Val Ala Glu Ile Leu Gly Lys Ile Met Gly Ser Leu His Ser Asn
65 70 75 80

Tyr Gln Pro Phe Ala Thr Leu Pro Asn Val Asn Lys Leu Ile Glu His
85 90 95

Glu Ile Asp Asn Ser Phe Pro Ser Asp His Thr Ile Leu Phe Phe Ser
100 105 110

Ile Gly Phe Leu Ile Phe Leu Phe His Lys Lys Thr Gly Trp Leu Trp
115 120 125

Leu Val Leu Ala Phe Ala Val Gly Ile Ser Arg Ile Trp Ser Gly Val
130 135 140

His Tyr Pro Leu Asp Val Ala Ala Gly Ala Leu Leu Gly Val Leu Ser
145 150 155 160

Ala Leu Phe Val Phe Trp Thr Ala Pro Lys Leu Ser Phe Ile His Gln
165 170 175

Met Leu Ser Leu Tyr Glu Lys Val Glu Gln Arg Ile Val Pro Ser Lys
180 185 190

Asn Lys Ser Asn Asp Lys Ser Lys Asn Phe
195 200

<210> 41

<211> 354

<212> PRT

<213> Homo sapiens

<400> 41

Gln Arg Ser Pro Leu Glu Lys Ala Ser Val Val Ser Lys Leu Phe Phe
1 5 10 15

Ser Trp Thr Arg Pro Ile Leu Arg Lys Gly Tyr Arg Gln Arg Leu Glu
20 25 30

Leu Ser Asp Ile Tyr Gln Ile Pro Ser Val Asp Ser Ala Asp Asn Leu
35 40 45

Ser Glu Lys Leu Glu Arg Glu Trp Asp Arg Glu Leu Ala Ser Lys Lys
50 55 60

Asn Pro Lys Leu Ile Asn Ala Leu Arg Arg Cys Phe Phe Trp Arg Phe
65 70 75 80

Met Phe Tyr Gly Ile Phe Leu Tyr Leu Gly Glu Val Thr Lys Ala Val
85 90 95

Gln Pro Leu Leu Leu Gly Arg Ile Ile Ala Ser Tyr Asp Pro Asp Asn
100 105 110

Lys Glu Glu Arg Ser Ile Ala Ile Tyr Leu Gly Ile Gly Leu Cys Leu
115 120 125

Leu Phe Ile Val Arg Thr Leu Leu Leu His Pro Ala Ile Phe Gly Leu
130 135 140

His His Ile Gly Met Gln Met Arg Ile Ala Met Phe Ser Leu Ile Tyr
145 150 155 160

Lys Lys Thr Leu Lys Leu Ser Ser Arg Val Leu Asp Lys Ile Ser Ile
165 170 175

Gly Gln Leu Val Ser Leu Leu Ser Asn Asn Leu Asn Lys Phe Asp Glu
180 185 190

Gly Leu Ala Leu Ala His Phe Val Trp Ile Ala Pro Leu Gln Val Ala
195 200 205

Leu Leu Met Gly Leu Ile Trp Glu Leu Leu Gln Ala Ser Ala Phe Cys
210 215 220

Gly Leu Gly Phe Leu Ile Val Leu Ala Leu Phe Gln Ala Gly Leu Gly
225 230 235 240

Arg Met Met Met Lys Tyr Arg Asp Gln Arg Ala Gly Lys Ile Ser Glu
245 250 255

Arg Leu Val Ile Thr Ser Glu Met Ile Glu Asn Ile Gln Ser Val Lys
260 265 270

Ala Tyr Cys Trp Glu Glu Ala Met Glu Lys Met Ile Glu Asn Leu Arg
275 280 285

Gln Thr Glu Leu Lys Leu Thr Arg Lys Ala Ala Tyr Val Arg Tyr Phe
290 295 300

Asn Ser Ser Ala Phe Phe Phe Ser Gly Phe Phe Val Val Phe Leu Ser
305 310 315 320

Val Leu Pro Tyr Ala Leu Ile Lys Gly Ile Ile Leu Arg Lys Ile Phe
325 330 335

Thr Thr Ile Ser Phe Cys Ile Val Leu Arg Met Ala Val Thr Arg Gln
340 345 350

Phe Pro

<210> 42

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 42
tttttggatc caattccaat ggatggatcat ggag

34

<210> 43

<211> 41

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 43
aaggatccaa gcttcaagg ttaggctttg aattattg c

41

<210> 44

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 44
tttttggatc caatgctttt ggtggaggga aaaatc

36

<210> 45

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 45
ctcagcggg gcagcagcc

19

<210> 46

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 46

cgcggatccc atggggacaa taattcaaag c

31

<210> 47

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 47

ggcgaattca cgcgttaaaa taataatttc tggctcac

38

<210> 48

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 48

ccggggtacc aatttggtga atttcacag aatgatc

37

<210> 49

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 49

ggcgaattca cgcgtagca acgaggggtg ctccc

35

<210> 50

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 50

cgcgatccg cagacgtggc tggcgcc

27

<210> 51

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic oligonucleotide

<400> 51

ggcgaattca cgcgtagca ttgctcacg tgagtttc

38

<210> 52

<211> 30

<212> DNA

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Leu Ser Gln Lys Gly Tyr Ser Trp Ser Gln Phe Ser Asp Val Glu Glu
20 25 30

Asn Arg Thr Glu Ala Pro Glu Gly Thr Glu Ser Glu Met Glu Thr Pro
35 40 45

Ser Ala Ile Asn Gly Asn Pro Ser Trp His Leu Ala Asp Ser Pro Ala
50 55 60

Val Asn Gly Ala Thr Ala His Ser Ser Ser Leu Asp Ala Arg Glu Val
65 70 75 80

Ile Pro Met Ala Ala Val Lys Gln Ala Leu Arg Glu Ala Gly Asp Glu
85 90 95

Phe Glu Leu Arg Tyr Arg Arg Ala Phe Ser Asp Leu Thr Ser Gln Leu
100 105 110

His Ile Thr Pro Gly Thr Ala Tyr Gln Ser Phe Glu Gln Val Val Asn
115 120 125

Glu Leu Phe Arg Asp Gly Val Asn Trp Gly Arg Ile Val Ala Phe Phe
130 135 140

Ser Phe Gly Gly Ala Leu Cys Val Glu Ser Val Asp Lys Glu Met Gln
145 150 155 160

Val Leu Val Ser Arg Ile Ala Ala Trp Met Ala Thr Tyr Leu Asn Asp
165 170 175

His Leu Glu Pro Trp Ile Gln Glu Asn Gly Gly Trp Asp Thr Phe Val
180 185 190

Glu Leu Tyr Gly Asn Asn Ala Ala Ala Glu Ser Arg Lys Gly Gln Glu
195 200 205

Arg Phe Asn Arg Trp Phe Leu Thr Gly Met Thr Val Ala Gly Val Val
210 215 220

Leu Leu Gly Ser Leu Phe Ser Arg Lys
225 230